Relative Importance of Earnings and Cash Flow Information in Stock Pricing

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INTRODUCTION

The stock market is the medium by which partial ownerships of companies are exchanged. In order to determine whether to buy or sell a stock, investors need methods to estimate the value of a company. In fact, financial valuation of a company's worth is critical for the efficiency and stability of the stock market. This work examines two aspects of company valuation and assesses how they contribute to stock price and how they complement each other.

BACKGROUND AND SIGNIFICANCE

Background:

The three main forces that drive a company's stock prices are company value, company quality, and investor sentiment. Value is calculated using company fundamentals (financial information in corporate filings) such as Earnings Per Share (EPS). Quality is a measure of how stable, safe, and profitable a company is. Investor sentiment refers to "optimism" or "pessimism" by investors that is not justified by existing fundamentals, often influenced by media.

We can illustrate these concepts using Apple Inc. As of the time of this writing, each share of Apple earns $8.33, which means its EPS is $8.33. One can calculate total earnings by multiplying EPS by shares outstanding. CFO, Cash Flow from Operating Activities (i.e. income from primary business practices) is used in measuring company quality. Apple's CFO last year was $66B.

Question:

Value and quality both depend on company fundamentals. This connection leads to the question: "What are the relative significances of value-related information compared to quality-related information when analyzing a company's stock price?"

Prior Research:

In "The Use of the P/E Ratio to Stock Valuation", P/E ratio is shown to be a useful indicator for estimating the intrinsic value of a stock. However, using simply one financial ratio is not enough for a complete analysis of a company's fundamentals. The paper "What Drives Stock Price Movements?" emphasizes the importance of cash flow information. It states, "a price change can be decomposed into two pieces: (1) "CF news," defined as the price change holding the implied cost of capital (ICC) constant, and (2) "DR news," defined as the price change holding the cash flow forecasts constant." While these previous studies have determined the individual importance of both value and quality information by themselves, the significance of this research project is that it builds upon prior research by assessing the relative importance of value versus quality information.

ACKNOWLEDGEMENTS / REFERENCES

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RESEARCH METHODOLOGIES

1. Data Sources Explored:

Pros:	Cons:
Quantopian	
Data is ready to be used	Data cannot be used elsewhere
Good community for learning	High learning curve for platform
Data visualization readily available	Price data not dividend adjusted (critical error)
Quandl	
Data contains all information needed	Only data supplied, lacks platform
Price data is split / dividend adjusted	Needs research environment setup
Data presented in simple csv format	

2. Methodology

First, I downloaded all of the possible data on company fundamentals and historical pricing from the past fifteen years from Quandl, a website that provides a large selection of financial data. The data came in the form of csv files so in order to process it, I used an iPython Notebook and converted all relevant csv files into Pandas DataFrames. Pandas is a Python library that specializes in data manipulation and analysis. DataFrames are data structures representing a table that facilitate the processing of data. Using the capabilities of DataFrames, I selected the relevant fundamental and historical price data that I needed: EPS and CFO quarterly data. I multiplied EPS and price by the number of shares to get total earnings and market capitalization. Once I acquired all relevant data, I validated that data against Yahoo Finance as a second data source, in order to ensure that the data was split and dividend adjusted.

Next, I merged the price DataFrame with the fundamentals DataFrame and then grouped the new DataFrame by quarter. After grouping, I ran the regression MCap ~ Earnings + CFO and examined the graphed data. I discovered a few major outliers in the process so I cleaned the data using these filters: Earnings / Mcap < 10, and CFO / Mcap < 15. The last process in data cleaning addressed "Peek Ahead Bias" which made sure that I didn't compare prices (MCap) reached by the end of a quarter with earnings or CFO associated with that past quarter, because the data would not have been published yet. Instead, I used earnings and CFO data associated with the period two quarters prior to that of the MCap data.

DATA ANALYSIS AND RESULTS

The three time series of R-Squared values in Figure 1 show how much the inputs can explain stock price variations across different stocks at different times. The R0 time series (blue) shows that CFO alone is a respectable indicator, with R-Squared values reaching approximately 60%. R1 (yellow) shows that earnings is a dominant indicator when compared to CFO. R2 (green) as compared to R1 shows the combined explanatory power of earnings and CFO over earnings alone. Looking at the graphs, we see that at certain time periods, CFO does not contribute much (there is little difference between R1 and R2). However, during specific time periods (2008-2009, 2015-2016), CFO is significant in its incremental explanatory power over earnings alone.

Conclusion:

We conclude that CFO is incrementally useful over earnings information, but only during certain time periods. In addition, earnings is shown to be the primary indicator while CFO is a secondary indicator.

Figure 1: R-Squared of MCap ~ CFO, MCap ~ Earnings, MCap ~ Earnings + CFO

Robustness check:

- Is the above regression dominated by large MCap data points?
- While the common approach focuses on the % change in MCap to avoid the issue, I instead group stocks into five bins based on MCap and perform the above regression on each bin. The graph of the largest MCap bin resembles Figure 1.
- Figures 2 - 5 display results of the four bins in increasing MCap order. While differing quantitatively, they all demonstrate the same marginal qualitative importance of CFO as compared to earnings alone.

Fig. 2

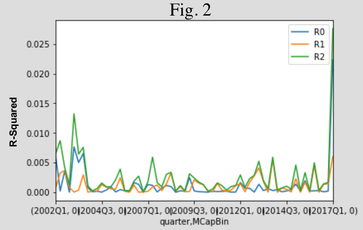

Fig. 3

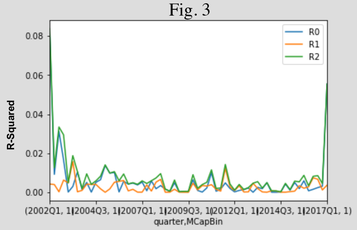

Fig. 4

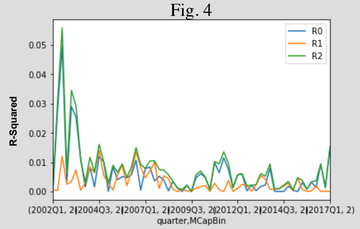

Fig. 5